

**TRAFFIC DATA COLLECTION/ANALYSIS  
FOR  
I-95 HOV/C-D ACCESS STUDY  
FREDERICKSBURG, VIRGINIA**

**Prepared For  
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## INTRODUCTION

This memorandum presents the methodology and data collected for the I-95 HOV/C-D Access Study. The I-95 corridor under study extended from north of U.S. Route 17 to south of Route 606. The traffic data that was collected for this corridor included the following:

1. 24-hour volume counts for northbound and southbound I-95 from Wednesday through Saturday at two sections, one each in Stafford and Spotsylvania Counties. Additionally, a 24-hour classification count at one section on I-95 for a one day period was also conducted.
2. 24-hour volume counts for all on/off ramps at the interchanges of I-95 at U.S. Route 17, Route 3, U.S. Route 1 and Route 606 from Wednesday through Saturday.
3. 24-hour volume counts from Wednesday through Saturday on U.S. Route 17, Route 3, U.S. Route 1 and Route 606 at or near the interchanges with I-95.
4. 24-hour volume counts from Wednesday through Saturday on selected roads at the point where they cross over or under I-95. These roads include U.S. Route 17 Bypass, Route 627, Route 652, Route 639, Route 620, Route 208, Route 608, and Route 607.
5. Turning movement counts at eleven at-grade intersections for three 2-hour periods (weekday AM, weekday PM and Saturday mid-day).
6. Travel time data using the floating car technique for each I-95 mainline section in Stafford and Spotsylvania Counties for weekday AM and PM periods.

## METHODOLOGY

Three types of traffic data were collected for this study. Traffic volume and classification counts were conducted on roadways for a 24-hour period over several days, including weekend, using portable machine counters and road tubes. The second type of traffic data collected was turning movement counts at selected intersections using electronic counters by observers stationed at the intersections. The third type of data collected was travel time runs along the corridor using the floating car technique.

### PORTABLE MACHINE COUNTS

The volume counts on mainline I-95 were conducted using portable machines and road tubes. These counts were conducted on I-95 between U.S. Route 17 and Route 3, and between Route 3 and U.S. Route 1 in early May 2000. These counts

were collected in 15-minute intervals. The mainline I-95 classification counts (in 13 classes) between Route 3 and U.S. Route 1 were conducted by lane for each of the six lanes using portable machines and road tubes, in early May of 2000. The volume counts on all on/off ramps at the interchanges of I-95 at U.S. Route 17, Route 3, U.S. Route 1 and Route 606 were collected from Wednesday through Sunday using portable machines and road tubes. These counts were conducted during the period Wednesday, April 4 through Sunday, April 9, 2000. These counts were collected in 15-minute intervals.

Volume counts were conducted on U.S. Route 17, Route 3, U.S. Route 1 and Route 606 at or near the interchanges with I-95 (within one half mile of the ramp terminus) using portable machine counters and road tubes. These counts were conducted from Wednesday, June 14 through Sunday, June 18, 2000.

Volume counts were conducted on selected roads at the point where they cross over or under I-95, but before the first intersection beyond I-95. These roads include U.S. Route 17 Bypass, Route 627, Route 652, Route 639, Route 620, Route 208, Route 608, and Route 607. These counts were conducted using portable machine counters and road tubes from Thursday, May 4, 2000 through Tuesday, May 9, 2000

### TURNING MOVEMENT COUNTS

Turning movement counts were conducted at eleven at-grade intersections in the vicinity of I-95 for three 2-hour periods (weekday AM, weekday PM and Saturday mid-day). The eleven locations were as follows:

1. U.S. Route 1 / Route 208 / U.S. Route 1 Business
2. U.S. Route 1 / Route 606
3. Route 3 / Carl D Silver Parkway
4. U.S. Route 17 / Stanstead Road / Sanford Drive Route 670
5. U.S. Route 17 / U.S. Route 1
6. U.S. Route 17 Business / Short Street
7. U.S. Route 1 / Route 636
8. U.S. Route 1 / Route 620
9. U.S. Route 1 / Southbound on and off-ramps
10. U.S. Route 1 / Northbound on and off-ramps
11. Route 3 / Gate Way Village

The intersection of U.S. Route 1 / Route 208 / U.S. Route 1 Business was counted on Saturday mid-day only. The portable machine count data was utilized to identify the AM and PM peak periods for observation. The data showed that the weekday AM and PM peak periods were 7:00 to 9:00 AM and 4:00 to 6:00 PM. The Saturday mid-day peak period was determined to be 11:00 AM to 1:00 PM.

## TRAVEL TIME DATA

Travel time data was collected for each I-95 mainline section in Stafford and Spotsylvania Counties using the floating car technique. This data was collected for weekday AM and PM periods. Two cars were used over a period of two days to record as many trips as possible on the approximately 35 mile segment of I-95. Travel time was recorded as the vehicle crossed each interchange between Route 234 and Route 606 on I-95. Both northbound and southbound movements on I-95 were observed.

## **TRAFFIC DATA**

The traffic data collected above was analyzed and this section presents the data and general summaries.

## PORTABLE MACHINE COUNTS

The volume count data collected on mainline I-95 is displayed in hourly increments in Exhibit 1. The counts are shown for a typical weekday (Thursday) and the weekend days (Saturday and Sunday). The hourly traffic volumes on I-95 are shown separately for trucks and automobiles in Exhibit 2 for a typical weekday. As shown in the Exhibit, the truck volumes are relatively constant throughout the day, except for a peak during the afternoon (1 PM to 3 PM). Exhibits 3 through 8 show hourly traffic volumes on selected roadways (U.S. Route 17, Route 3, U.S. Route 1, Route 208, Route 620 And U.S. Route 17 Bypass) in the vicinity of I-95 for a typical weekday (Thursday) and the weekend days (Saturday and Sunday). These exhibits show that the weekday counts have a distinct AM and PM peak, whereas, the weekend counts do not show similar trends.

The data collected at all locations was analyzed to determine the weekday AM and PM peak hours and Saturday mid-day peak hour. The peak hours were as follows: 7:30 to 8:30 AM and 4:30 to 5:30 PM on weekdays and 11:00 AM to 12:00 PM on Saturday. The peak hour traffic volumes data was averaged over the several weekdays to determine peak hour volumes at each location, for the three time periods (weekday AM and PM peak hour and Saturday mid-day peak hour). The data was utilized to develop balanced traffic flows along I-95 and the cross-streets for the three time periods. Peak hourly volume factors were also estimated for I-95 for the three time periods by direction and are as follows:

Direction	Time Period	Peak Hour/Daily Factor
Northbound	Weekday AM Peak Hour	0.0635
	Weekday PM Peak Hour	0.054

	Saturday Mid-day Hour	0.0604
Southbound	Weekday AM Peak Hour	0.044
	Weekday PM Peak Hour	0.0636
	Saturday Mid-day Hour	0.053

As noted above, volume and class counts were taken on mainline I-95. These data were utilized to develop axle correction factors for I-95. Further, MCV files included vehicle classification counts at selected interchanges on I-95. These data were utilized to develop axle correction factors for the ramps and interchanges. Classification data was available from VDOT for selected cross-streets, and these data were utilized to develop axle correction factors for the cross-streets. The percent of trucks and buses on I-95 were 7.18 percent and 6.84 percent, during the AM and PM peak hours, respectively. The axle correction factors were developed for each of the three time periods and are as follows:

Time Period	I-95	On/Off Ramps	Interchanges	Cross-streets
AM Peak Hour	0.86	0.86	0.94	0.98
PM Peak Hour	0.85	0.85	0.94	0.98
Saturday Mid-day Peak Hour	0.92	0.92	0.94	0.98

Exhibits 10 through 12 present the axle corrected balanced traffic flows on I-95 from north of U.S. Route 17 to south of Route 606, including all interchanges for each of the three time periods (weekday AM peak hour, weekday PM peak hour and Saturday mid-day peak hour). Exhibits 13 through 15 present the axle corrected traffic flows on the interchange roads off I-95, by direction, for each of the three time periods. Exhibits 16 through 18 present the axle corrected traffic flows on all cross-streets that go under or over I-95, by direction, for each of the three time periods.

### TURNING MOVEMENT COUNTS

The turning movements count data at the eleven intersections were analyzed to develop the AM and PM peak hour volumes and peak hour factors.

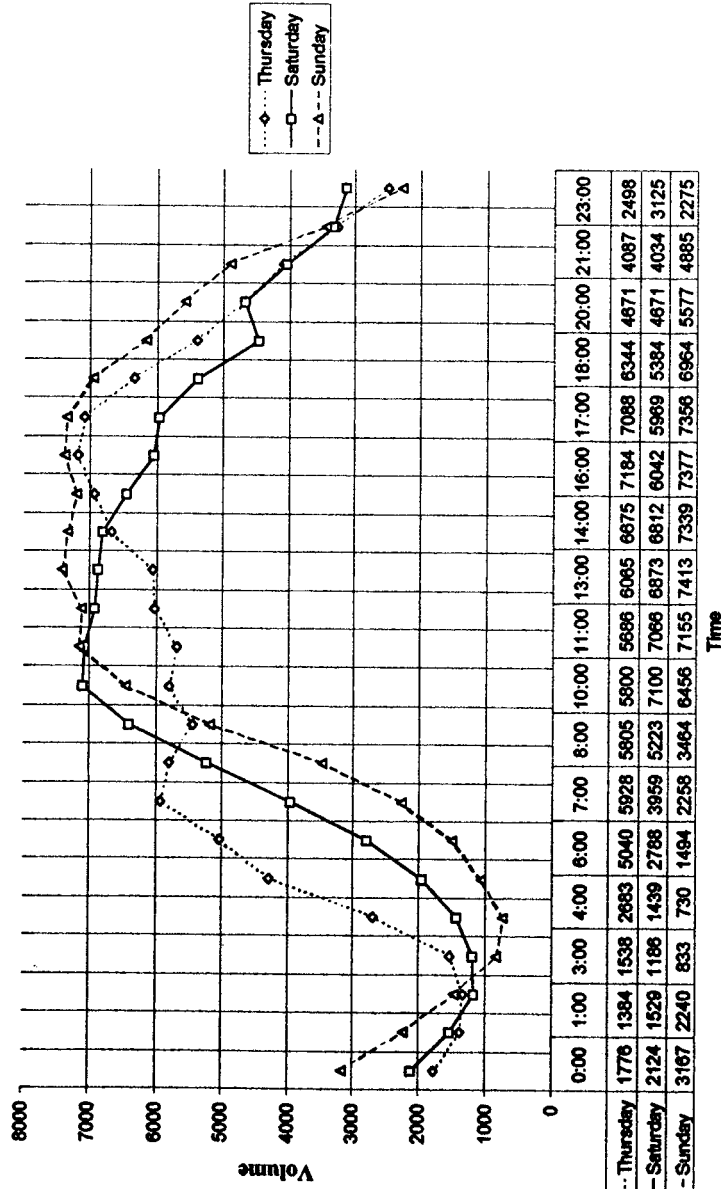
### TRAVEL TIME DATA

Exhibits 19 and 20 present the travel time results for the AM and PM periods, respectively. Results show that the southbound travel time varied between 29 minutes and 33 minutes during the AM period, however, the northbound travel time was 30 minutes for all four runs. The PM travel times were higher than AM and

varied between 32 minutes to 50 minutes for the southbound direction and between 35 minutes to 40 minutes for the northbound direction.



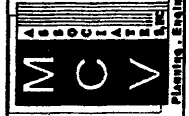
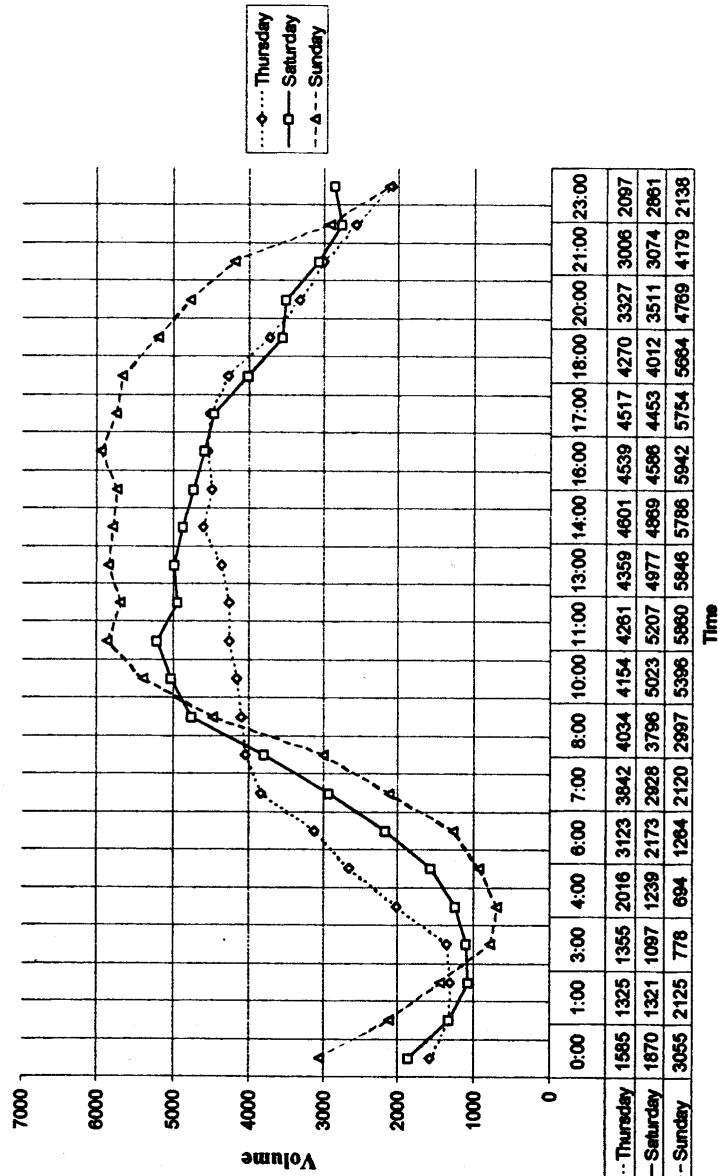
Hourly Volume On I-95



Hourly Traffic Volume on I-95 Between US 17 and VA Route 3

Exhibit 1

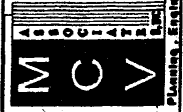
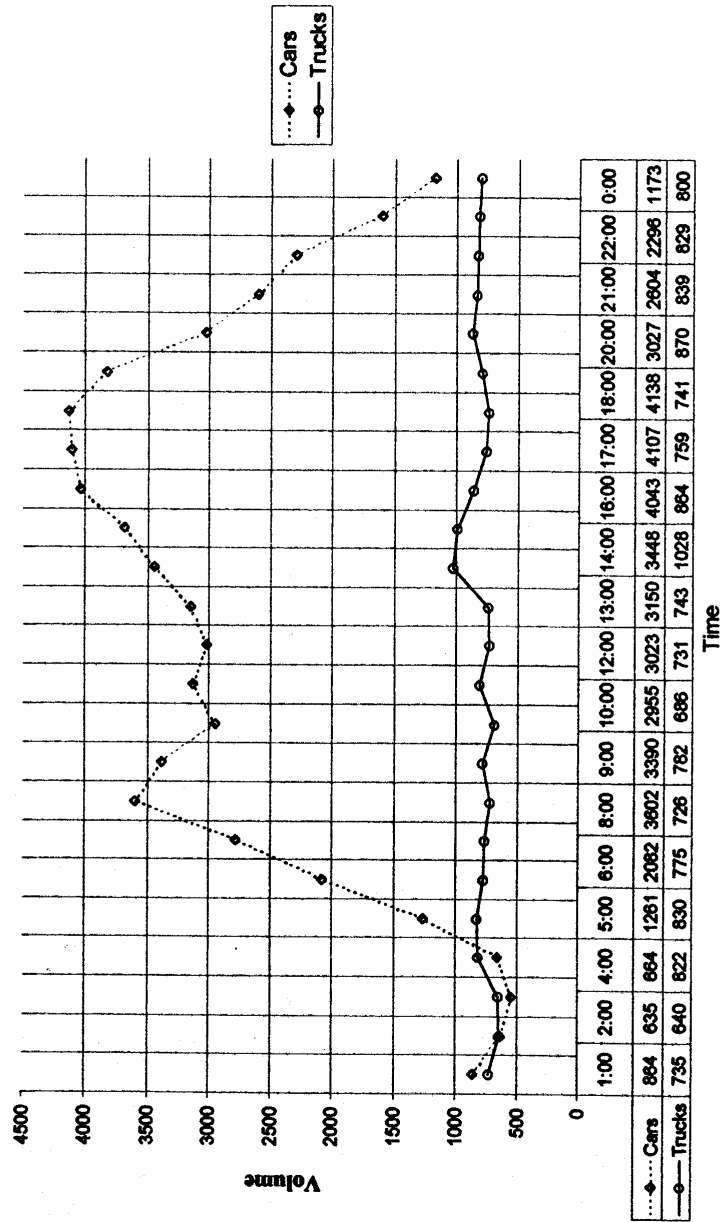
Hourly Volume On I-95



Hourly Traffic Volume on I-95 Between VA Route 3 and US 1

Exhibit 2

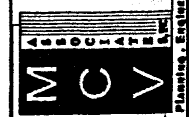
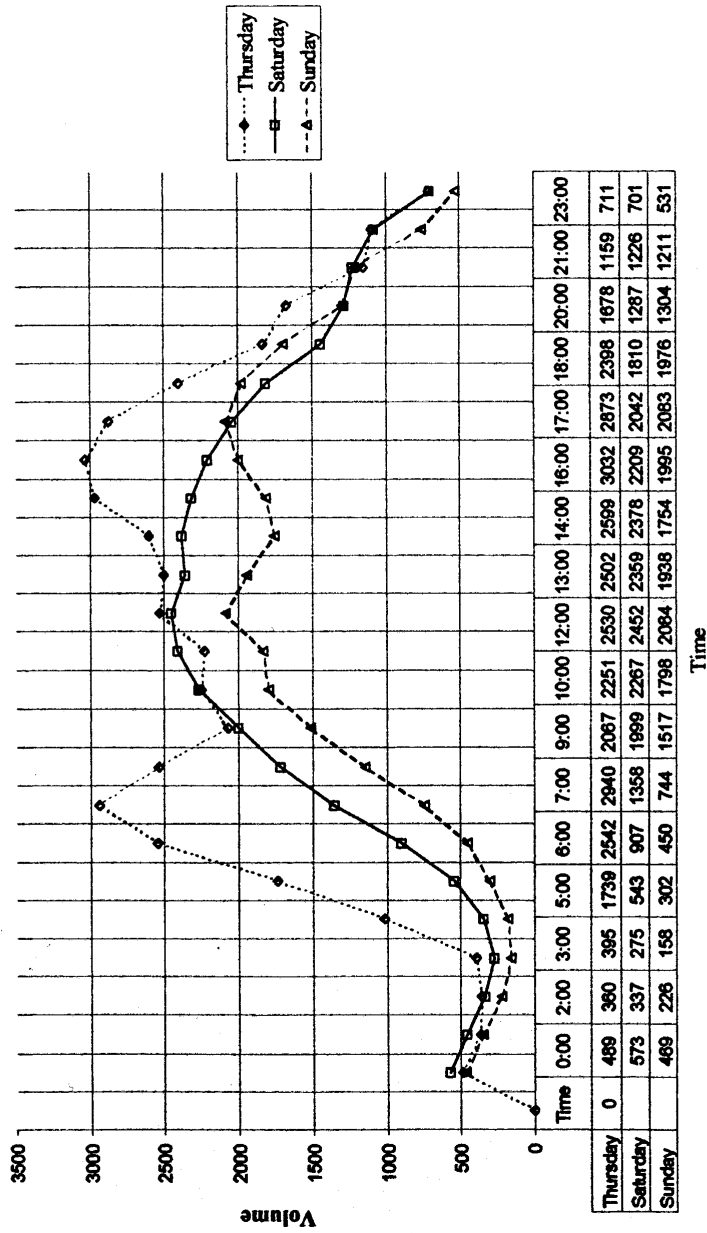
Hourly Traffic Volume on I-95



Hourly Traffic ( Cars / Trucks ) Volume on I-95  
Between VA Route 3 and US 1

Exhibit 3

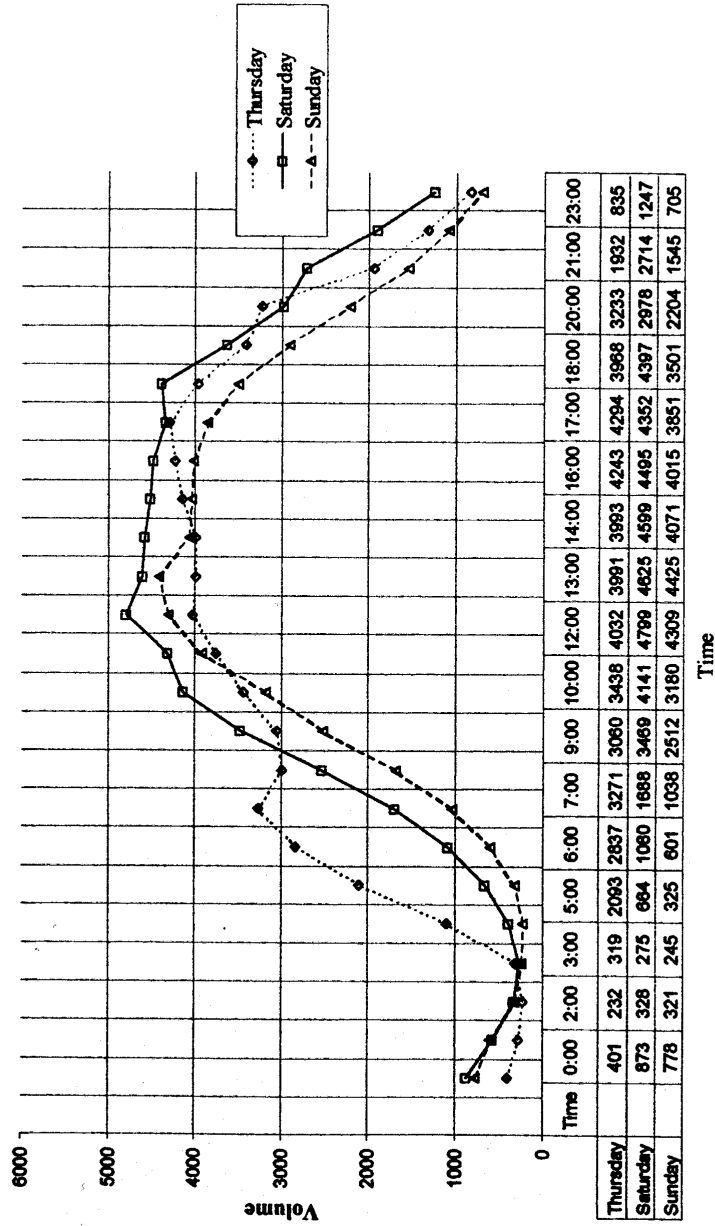
Hourly Traffic Volume on US 17 at I-95



Hourly Traffic Volume on US 17 at I-95

Exhibit 4

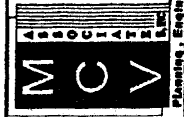
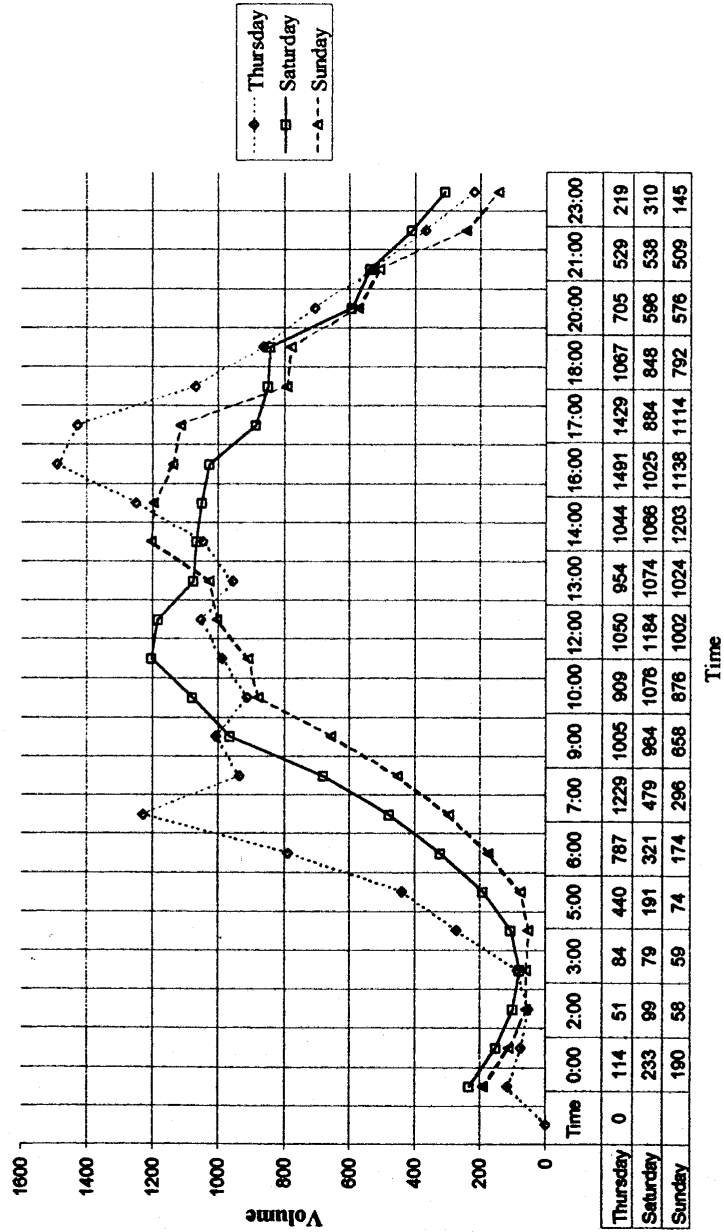
Hourly Traffic Volume on VA 3 at I-95



Hourly Traffic Volume on VA 3 at I-95

Exhibit 5

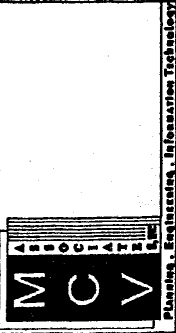
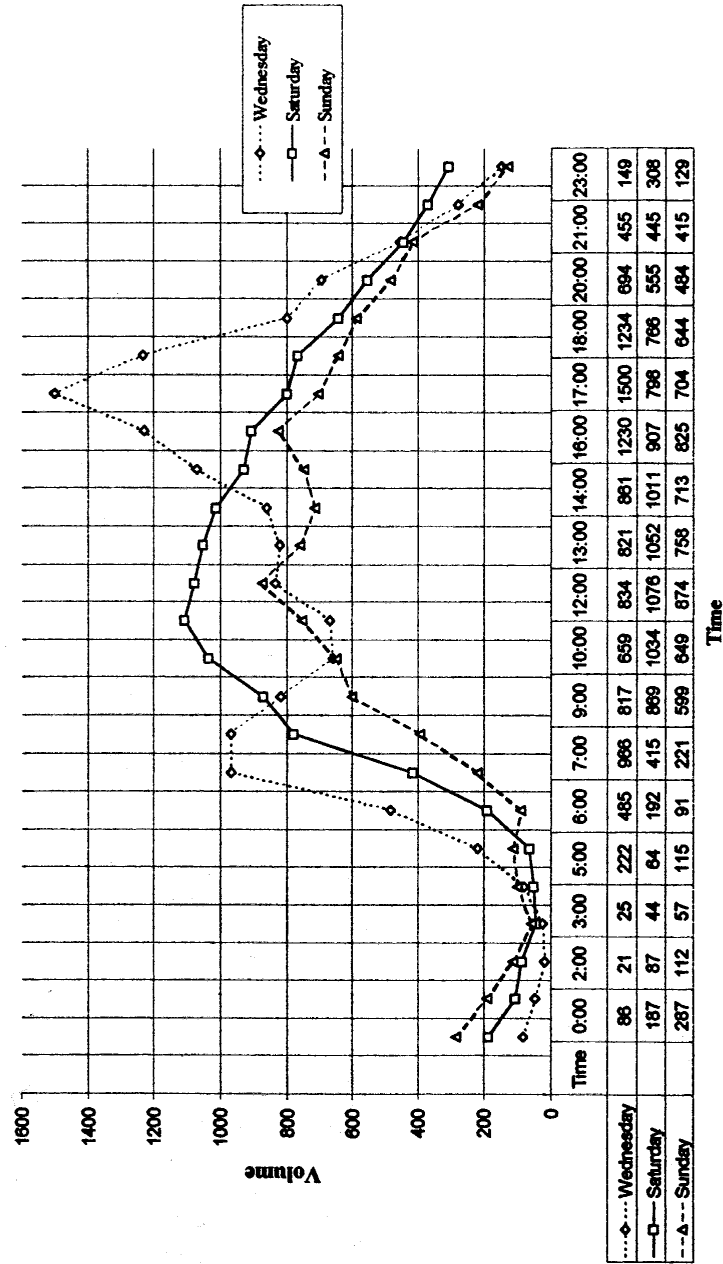
Hourly Traffic Volume on US 1 at I-95



Hourly Traffic Volume on US 1 at I-95

Exhibit 6

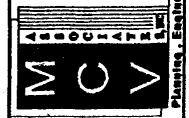
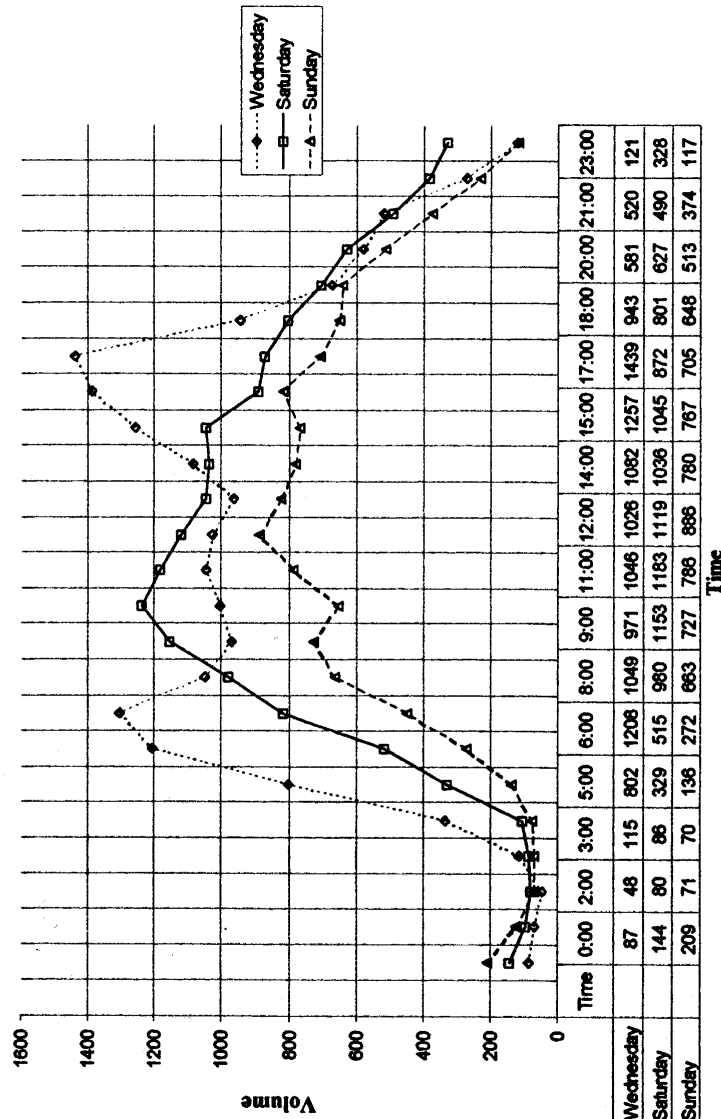
Hourly Traffic Volumes on VA620 at I-95



Hourly Traffic Volume on VA 620 at I-95

Exhibit 7

Hourly Traffic Volume on VA208 at I-95

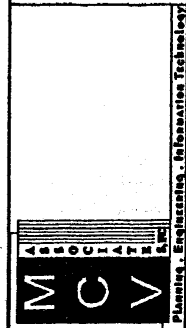
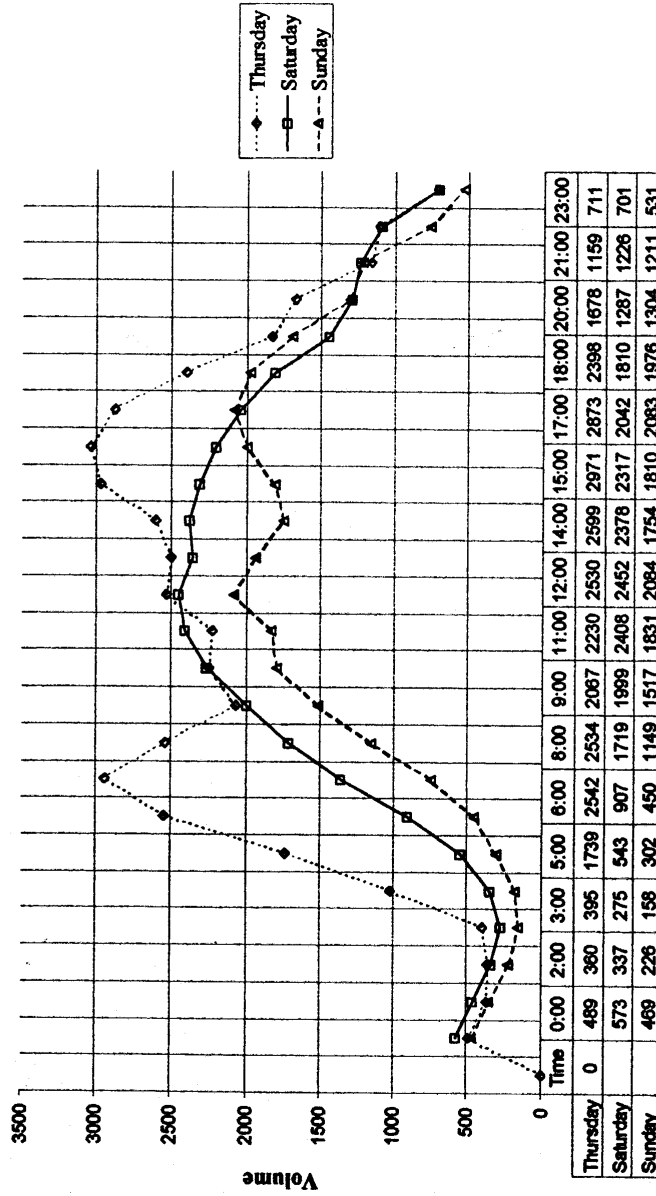


Hourly Traffic Volume on VA 208 at I-95

Exhibit 8

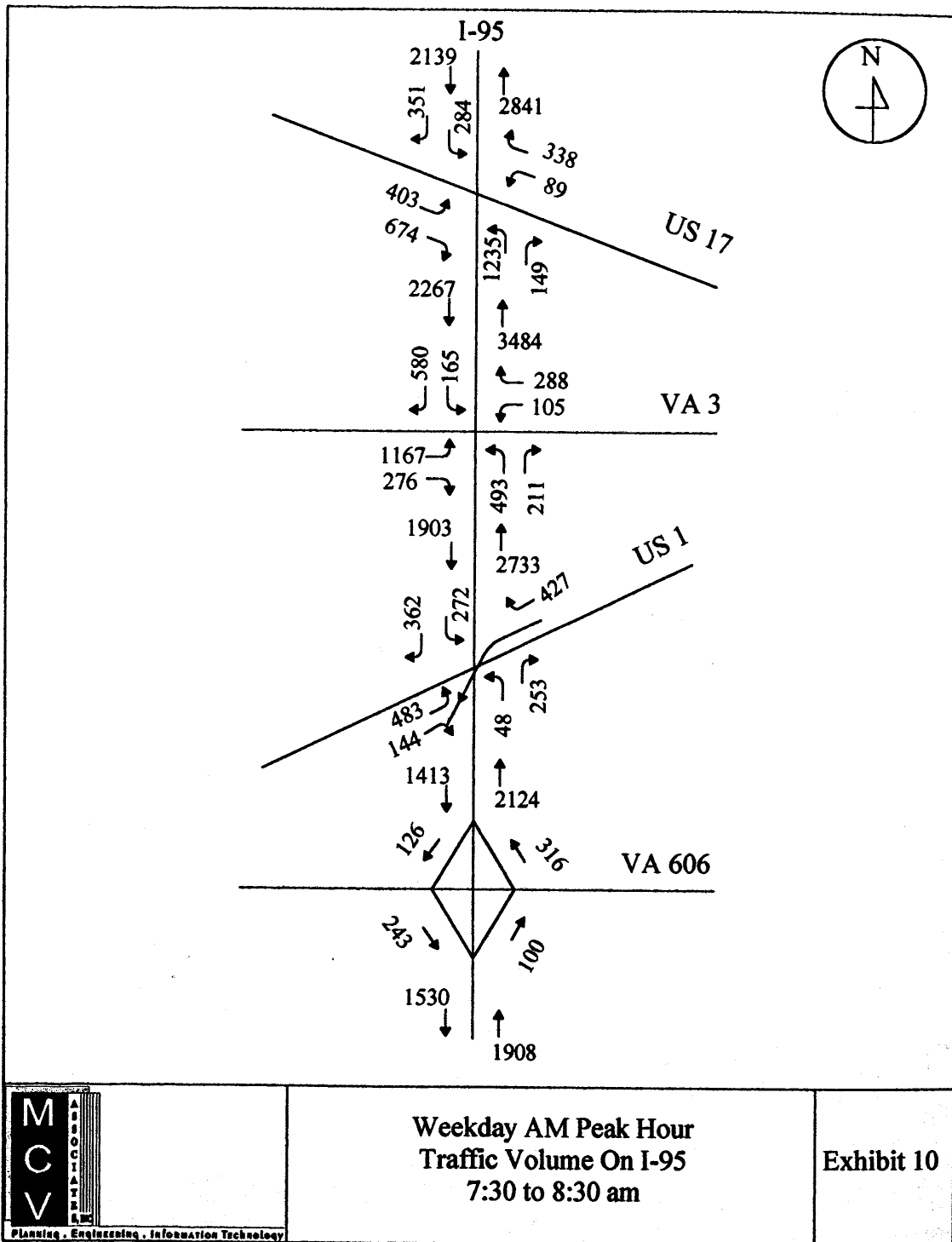


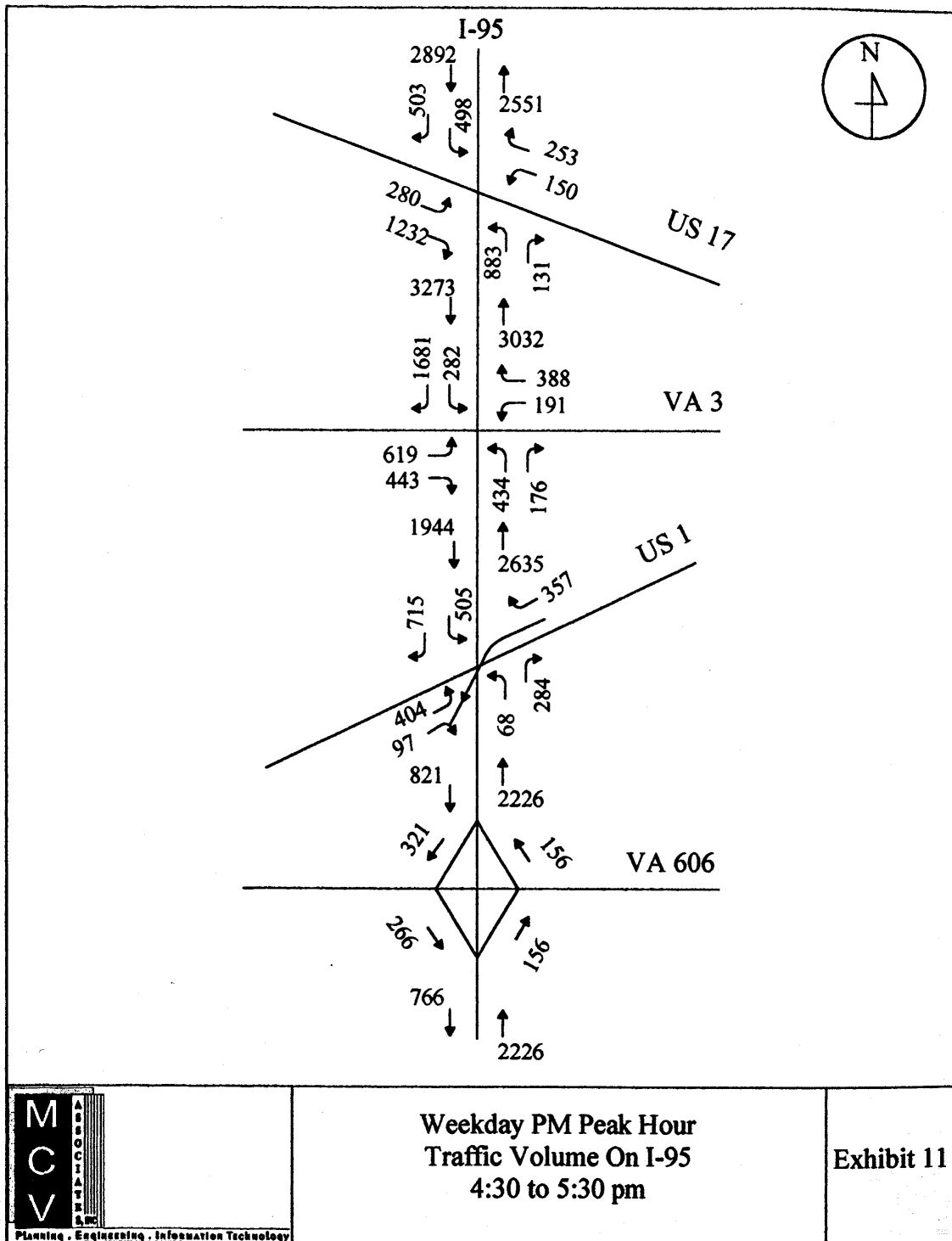
Hourly Traffic Volume on US 17 at I-95

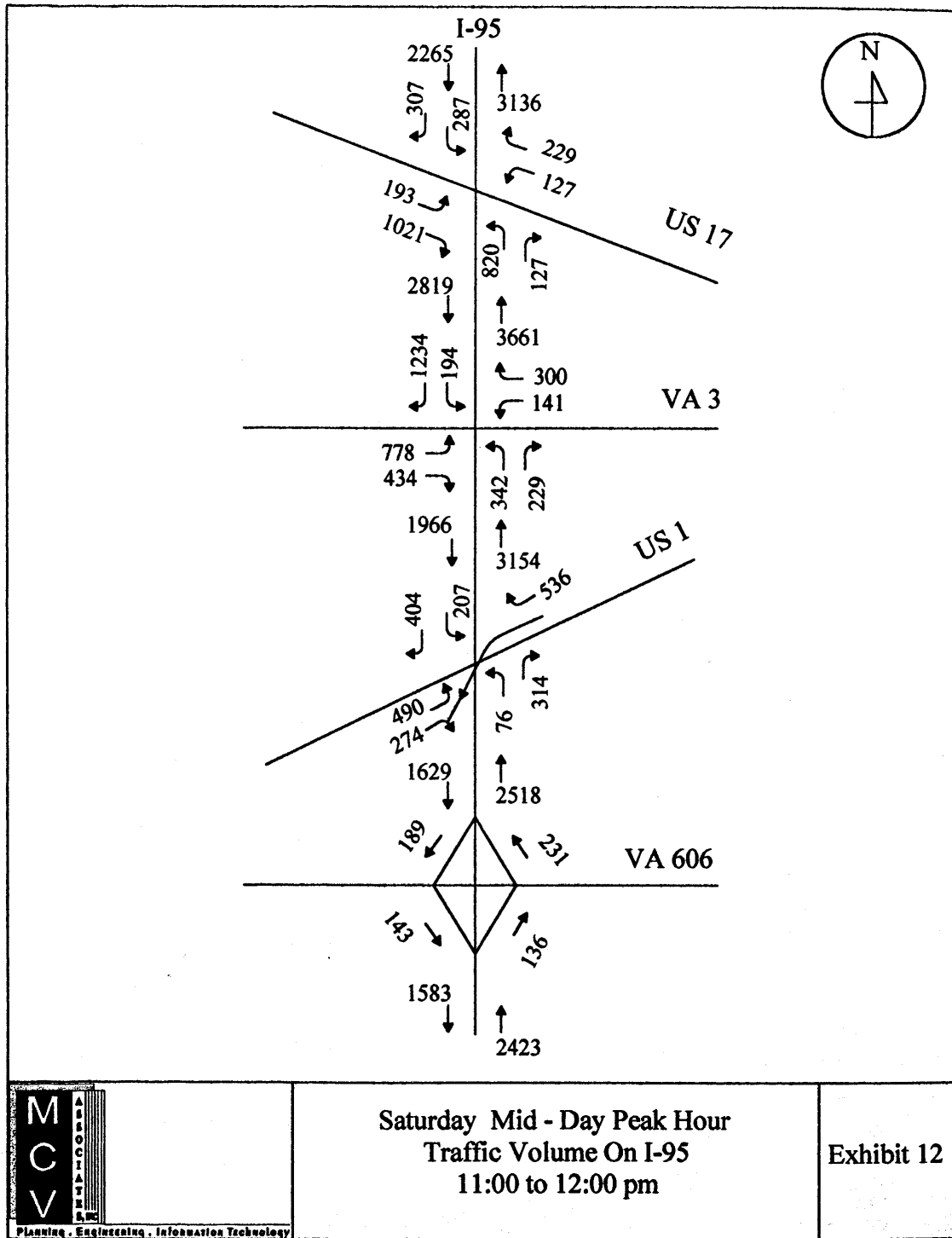


Hourly Traffic Volume on US 17 By Pass at I-95

Exhibit 9





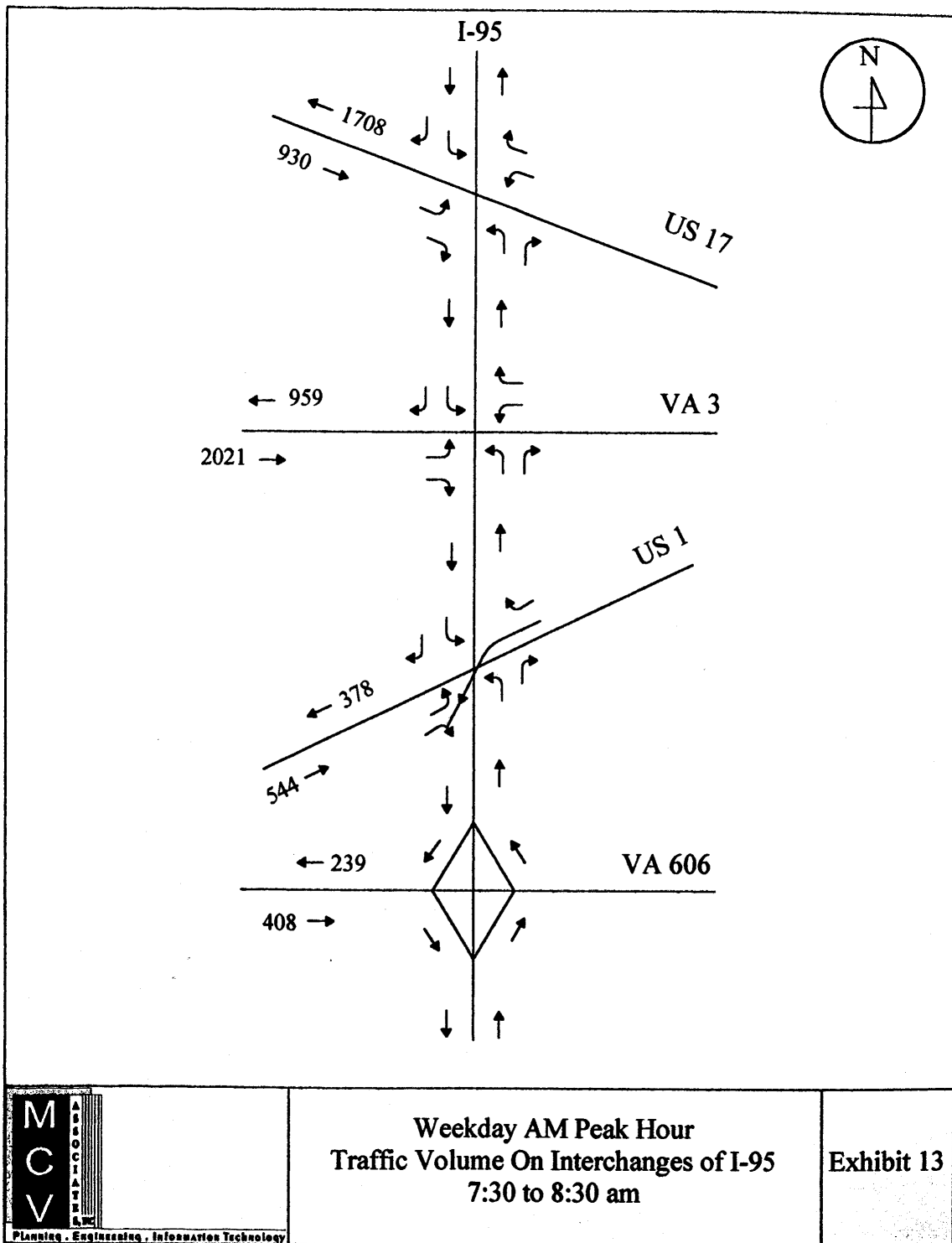


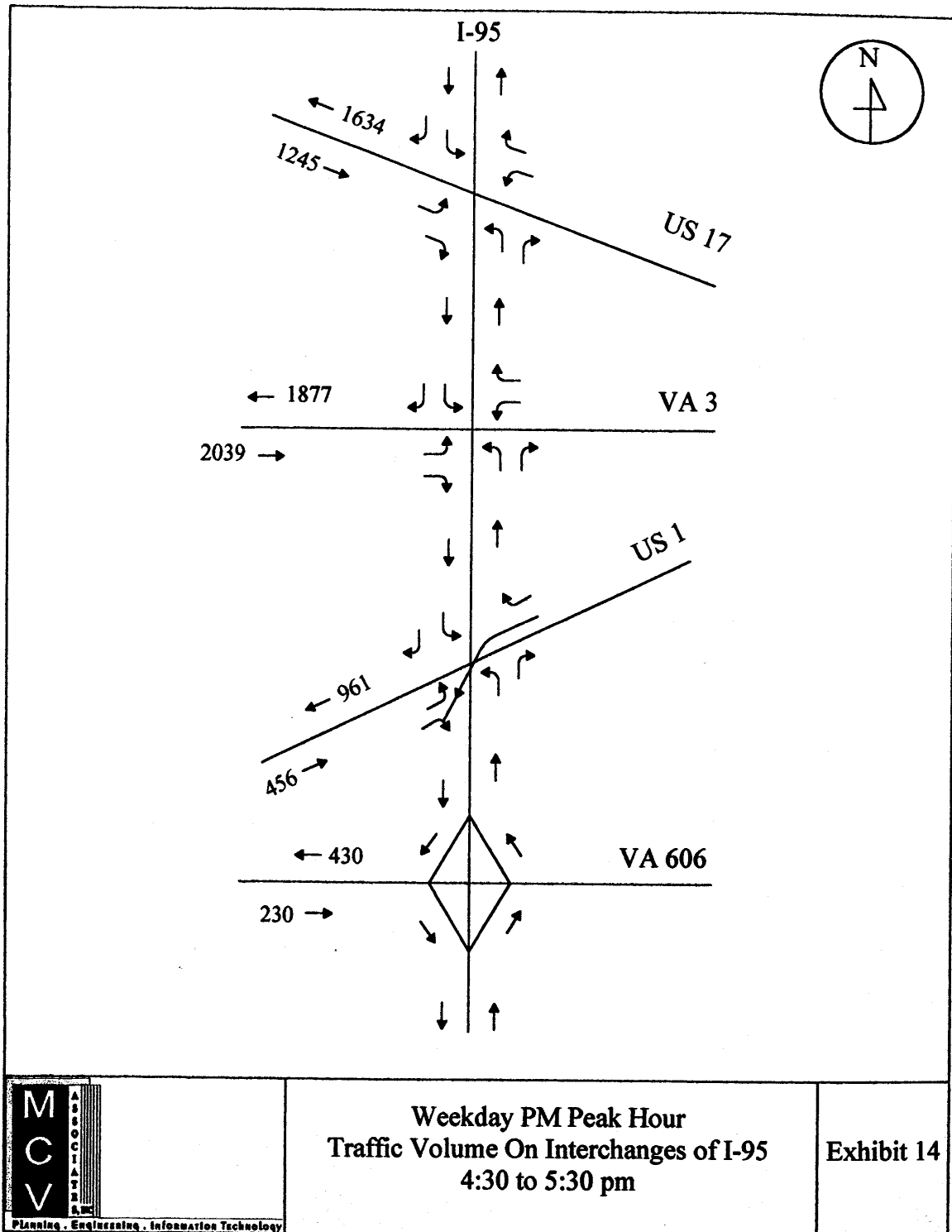
Saturday Mid - Day Peak Hour  
Traffic Volume On I-95  
11:00 to 12:00 pm

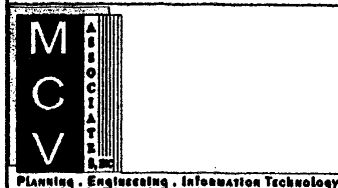
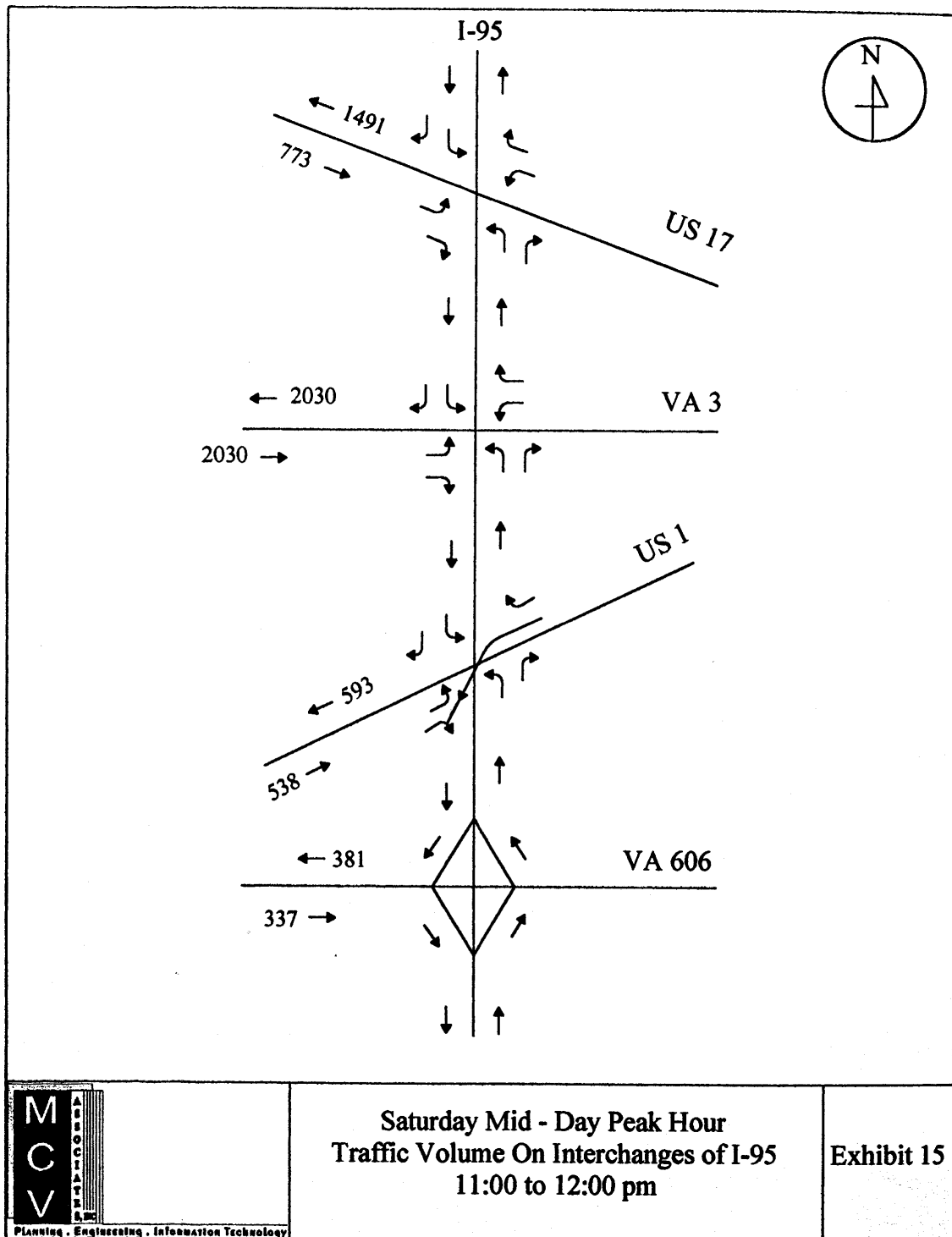
Exhibit 12

**M  
C  
V**

Planning . Engineering . Information Technology

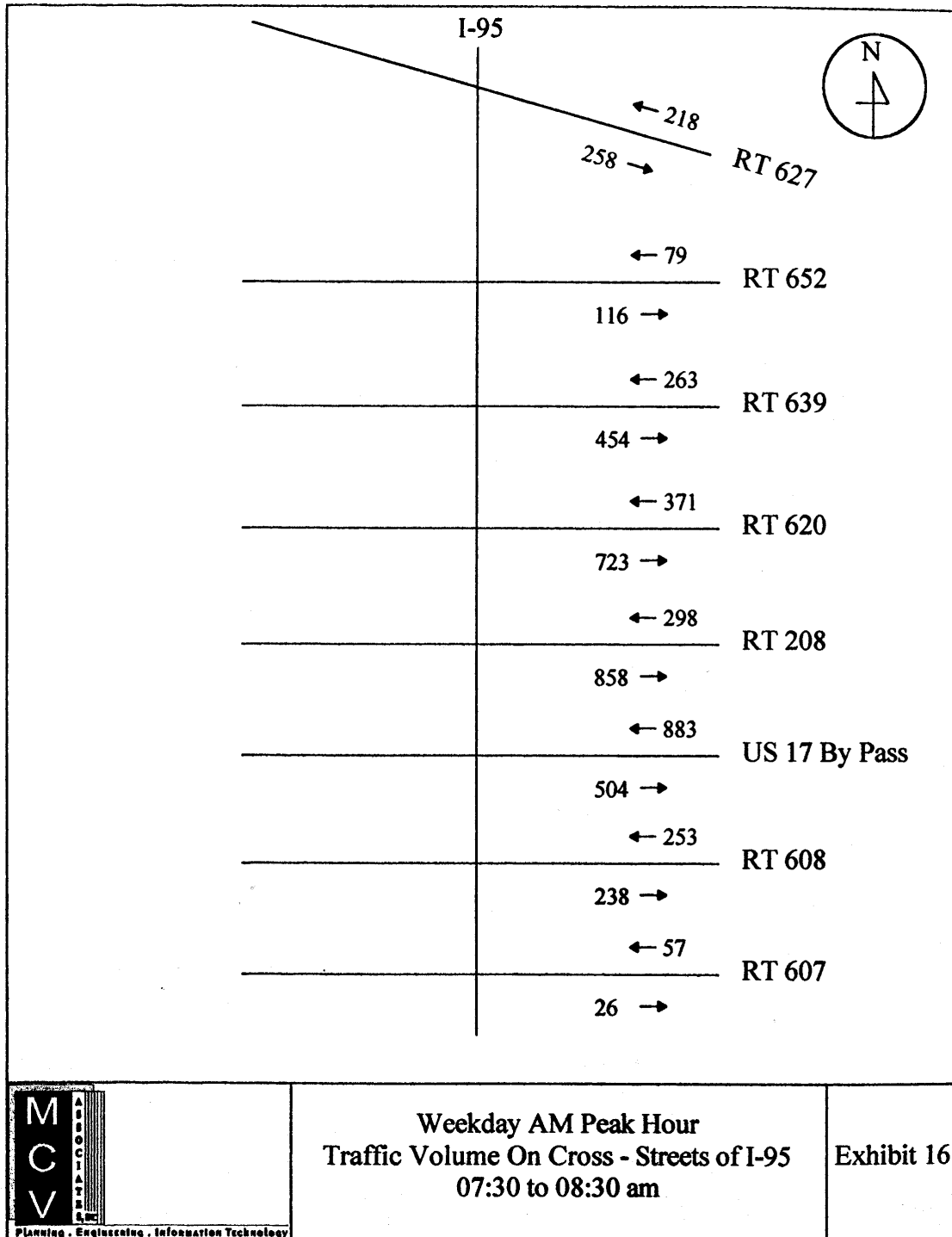




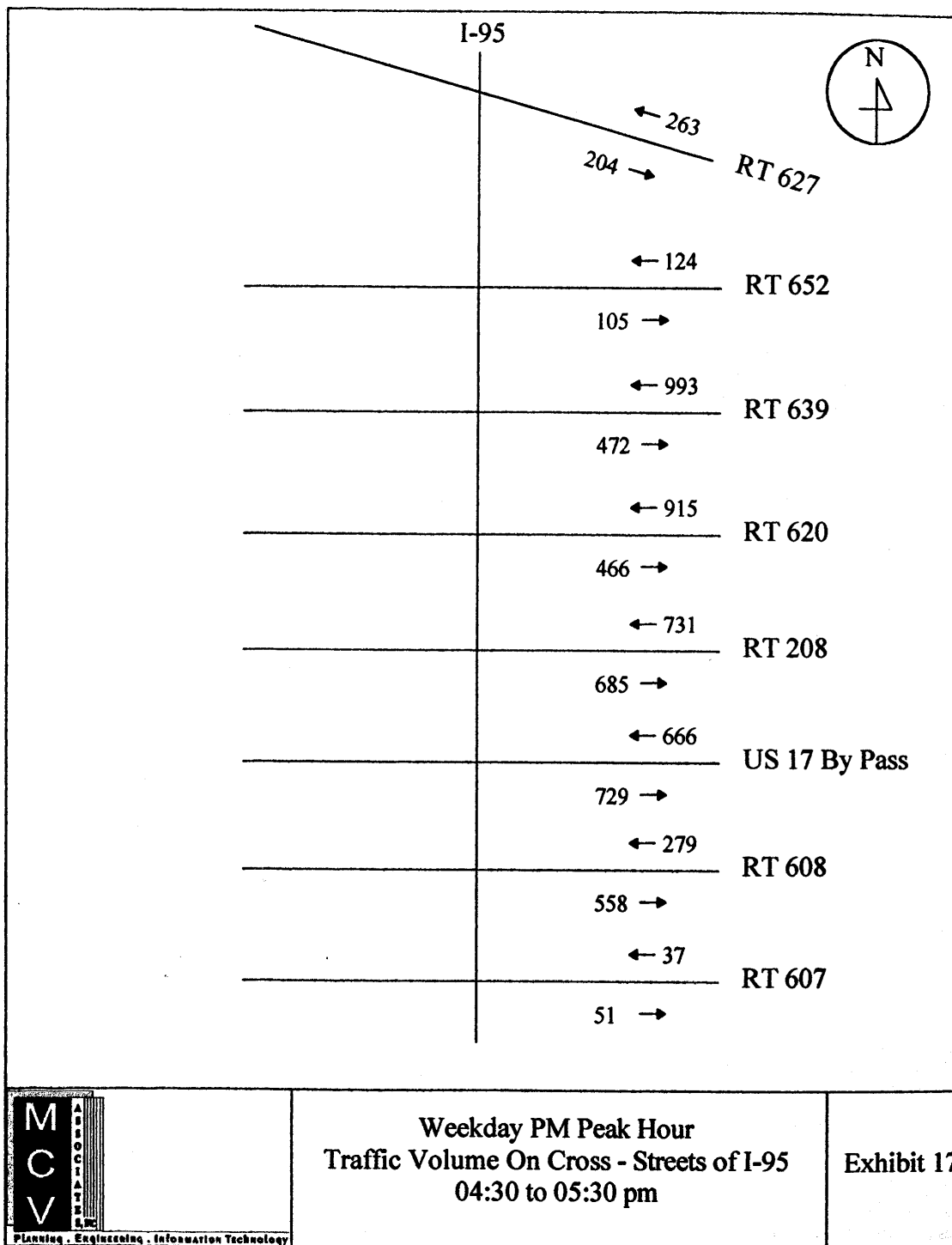


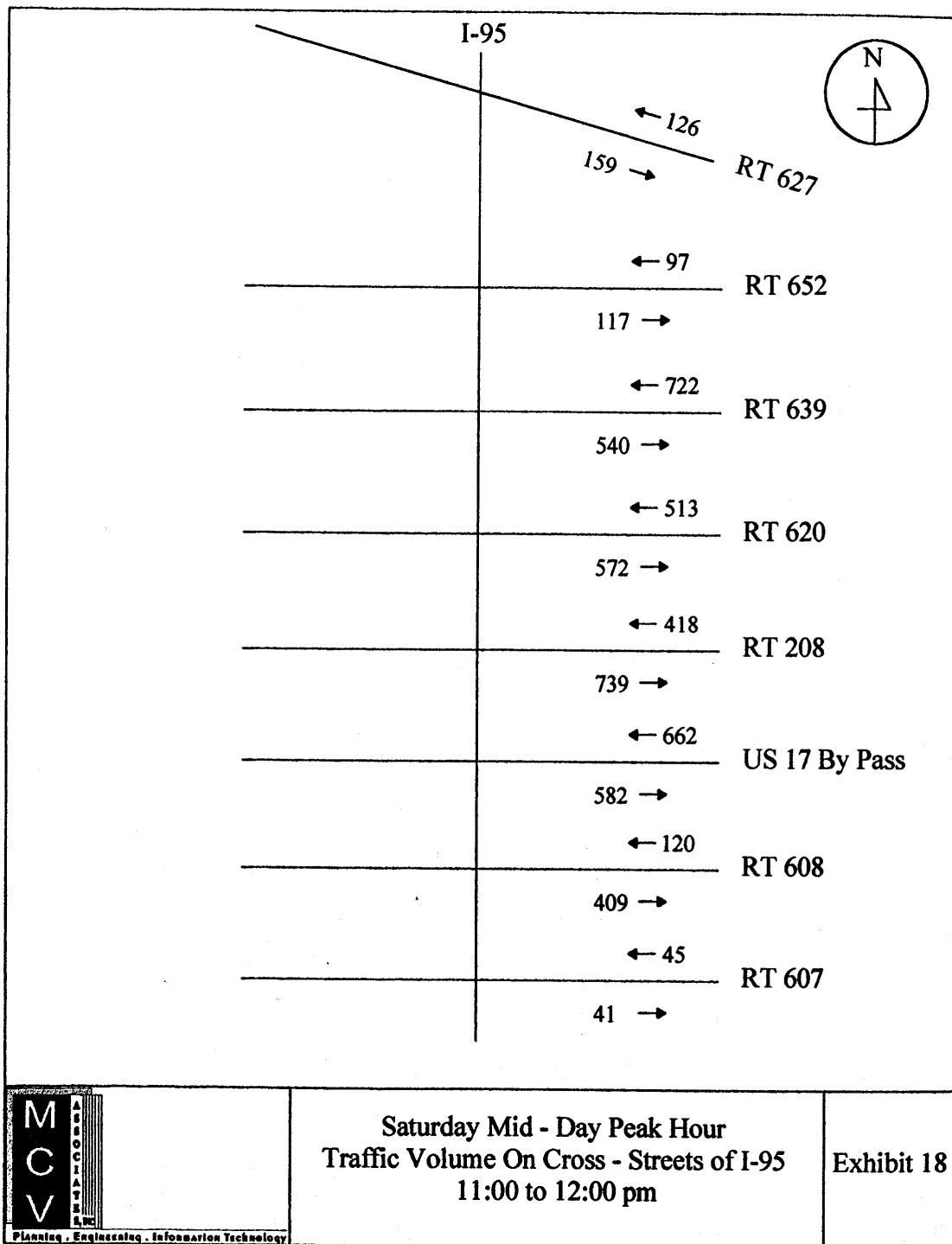
**Saturday Mid - Day Peak Hour  
Traffic Volume On Interchanges of I-95  
11:00 to 12:00 pm**

**Exhibit 15**









		DATE: 5/31/00 AND 6/01/00		WEATHER Sunny	
		NAME: RAJ		TIME PERIOD : AM	
		BEGIN TIME 07:22 AM AND 08:31AM			
EXITS	RUN NO 1	RUN NO 2	RUN NO 3	RUN NO 4	
	SB	SB	NB	NB	NB
RT234 -	152 07:22AM	08:23AM	08:24AM	08:31AM	09:35AM
					10:39AM
	150 07:24AM	08:20AM	08:22AM	08:34AM	09:40AM
					10:37AM
	148 07:25AM	08:18AM	08:20AM	08:36AM	09:42AM
					10:35AM
STAFFORD					
	143 07:29AM	08:14AM	08:16AM	08:41AM	09:46AM
					10:31AM
	140 07:32AM	08:12AM	08:13AM	08:44AM	09:49AM
					10:28AM
	133 07:37AM	08:06AM	08:07AM	08:51AM	09:55AM
					10:22AM
SPOTSYLVANIA					
	130 07:40AM	08:02AM	08:04AM	08:54AM	09:59AM
					10:18AM
	126 07:43AM	07:59AM	08:00AM	08:57AM	10:02AM
					10:16AM
	118 07:52AM	07:53AM	08:54AM	09:04AM	10:08AM
					10:09AM
		AM Travel Time Runs			
		Exhibit 19			

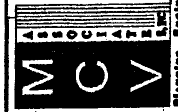



Exhibit 20

PM Travel Time Runs

DATE: 5/4/00 AND 5/09/00		WEATHER Sunny/Rain		
NAME: MSK		TIME PERIOD: PM		
		BEGIN TIME 4:00PM		
EXITS	RUN NO 1 SB	RUN NO 2 SB NB	RUN NO 3 SB NB	RUN NO 4 SB NB
RT234 - 152	4:00PM 5:28PM	5:30PM 6:50PM	4:00PM 5:15PM	5:15PM 6:45PM
150	4:08PM 5:22PM	5:32PM 6:47PM	4:04PM 5:12PM	5:19PM 6:40PM
148	4:07PM 5:20PM	5:35PM 6:44PM	4:08PM 5:09PM	5:21PM 6:37PM
STAFFORD				
143	4:11PM 5:15PM	5:39PM 6:40PM	4:10PM 5:08PM	5:28PM 6:30PM
140	4:15PM 5:18PM	5:43PM 6:38PM	4:13PM 5:02PM	5:30PM 6:25PM
133	4:22PM 5:07PM	5:50PM 6:29PM	4:20PM 4:54PM	5:37PM 6:20PM
SPOTSYLVANIA				
130	4:35PM 5:05PM	5:52PM 6:28PM	4:24PM 4:50PM	5:40PM 6:15PM
126	4:40PM 5:00PM	5:56PM 6:21PM	4:28PM 4:45PM	5:43PM 6:10PM
118	4:50PM 4:50PM	6:03PM 8:15PM	4:35PM 4:40PM	5:47PM 6:05PM


  
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## PM Travel Time Runs

Exhibit 20